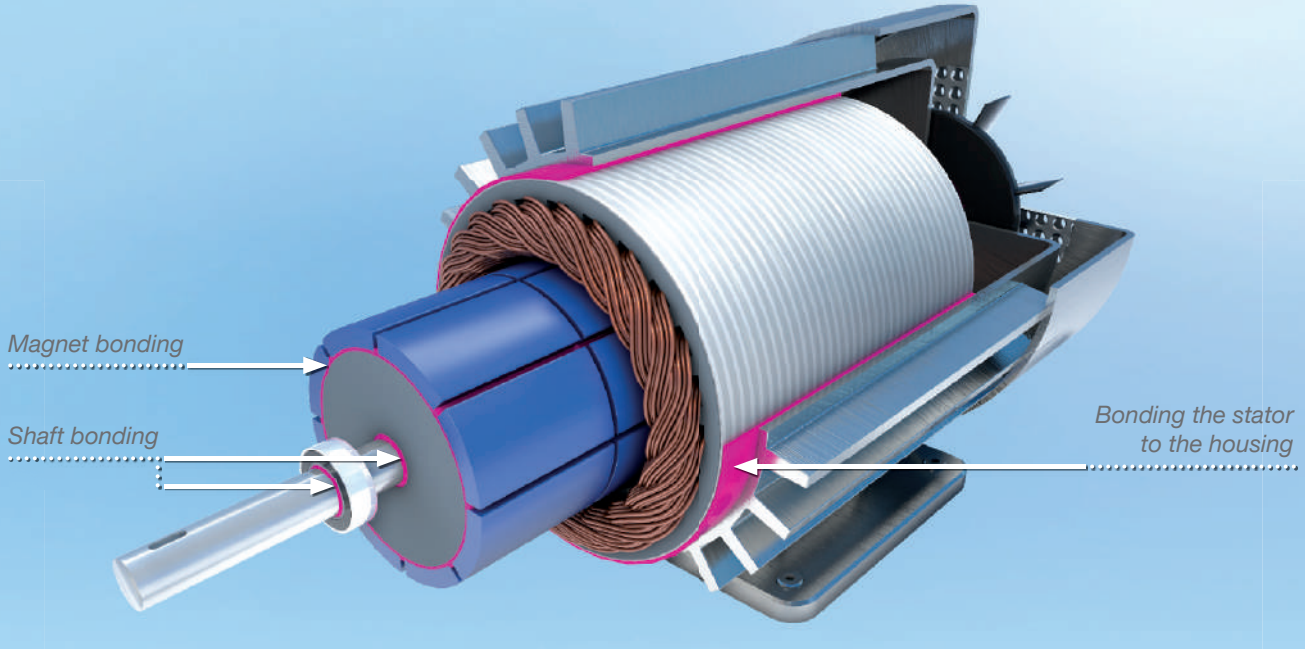
SUPRATEC SYNEO

DELO

Multiple bonds in e-motors

Adhesives for E-Motors



Adhesives for e-motors

When manufacturing modern e-motors, it is essential to improve the efficiency, for example by minimizing the air gap between magnet and winding. Since conventional methods, such as mechanical clamping or wrapping reach their limits due to high tolerances, bonding is the solution.

The requirements imposed on the e-motor components to be joined (and therefore also on the adhesives used) are high. In this respect, recurring buzz words such as temperature-resistant, media-resistant, gap-filling, impact-resistant and tension-equalizing are often used. The adhesives specially developed for e-motors have precisely these properties.

The overview on the left shows a selection of DELO adhesives used in specific e-motor applications according to their properties.

DELO's adhesives for …

FAST PROCESSES (LIGHT FIXATION < 10 S)

DELO-ML DB, DELO DUALBOND

HIGHLY RELIABLE CASTING

DELO-DUOPOX CR, DELO MONOPOX GE

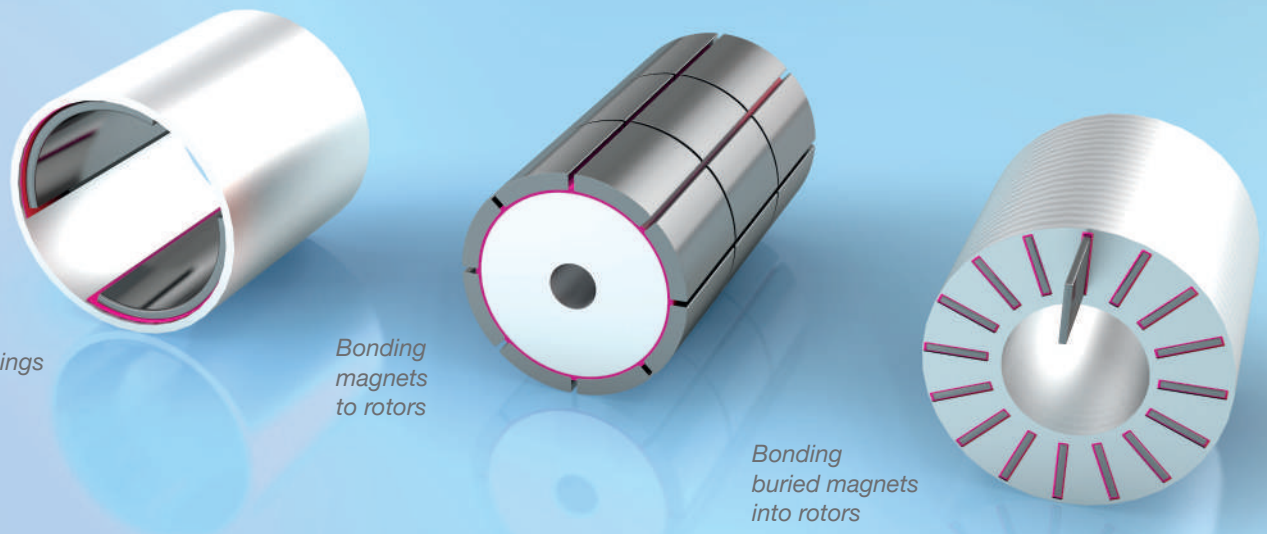
HIGH TOLERANCES, GAP-FILLING

DELO-DUOPOX, DELO-PUR

HIGH-TEMPERATURE APPLICATIONS (+220 °C)

DELO MONOPOX HT

***CR** = **C**asting **R**esin*
***DB** = **D**ual **B**onding*
***GE** = **G**eneral **E**ncapsulant*
***HT** = **H**igh **T**emperature*



Bonding magnets into housings

Bonding magnets to rotors

Bonding buried magnets into rotors

Magnet bonding

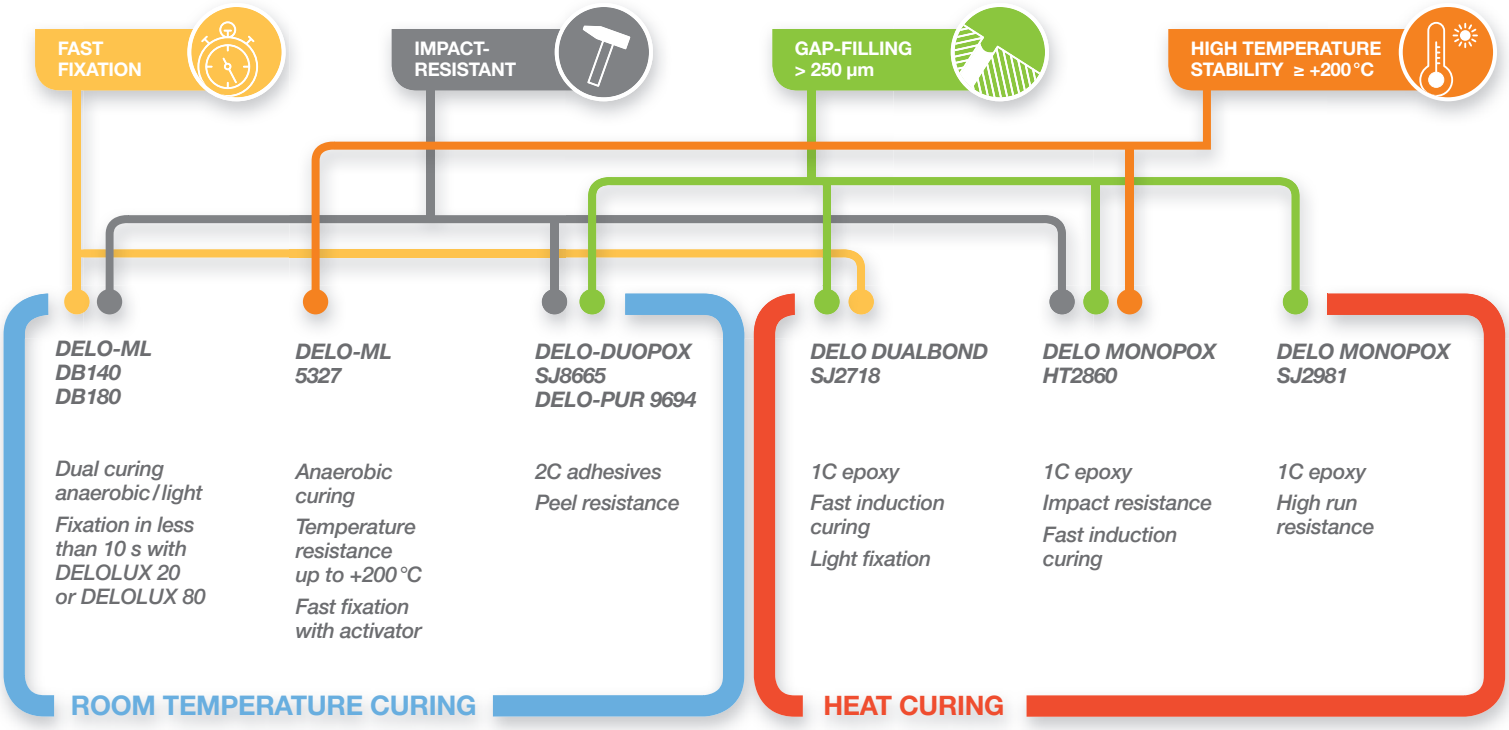
More and more e-motor magnets are bonded as adhesives have several property and process advantages over conventional mechanical joints:

- Tolerance compensation
- Evenly distributed stress
- Easy to automate
- Reduced vibration noise
- Good corrosion protection
- No component damage during joining

Your benefits

- High temperature stability up to +220 °C
- Excellent media resistance
- Good gap filling
- Fast light fixation (< 10 s)
- Tension-equalizing

Find the right adhesive …



DB = Dual Bonding *HT = High Temperature* *SJ = Structural Joining*

Brushless DC motor
© ebm-papst

Bond stator to housing

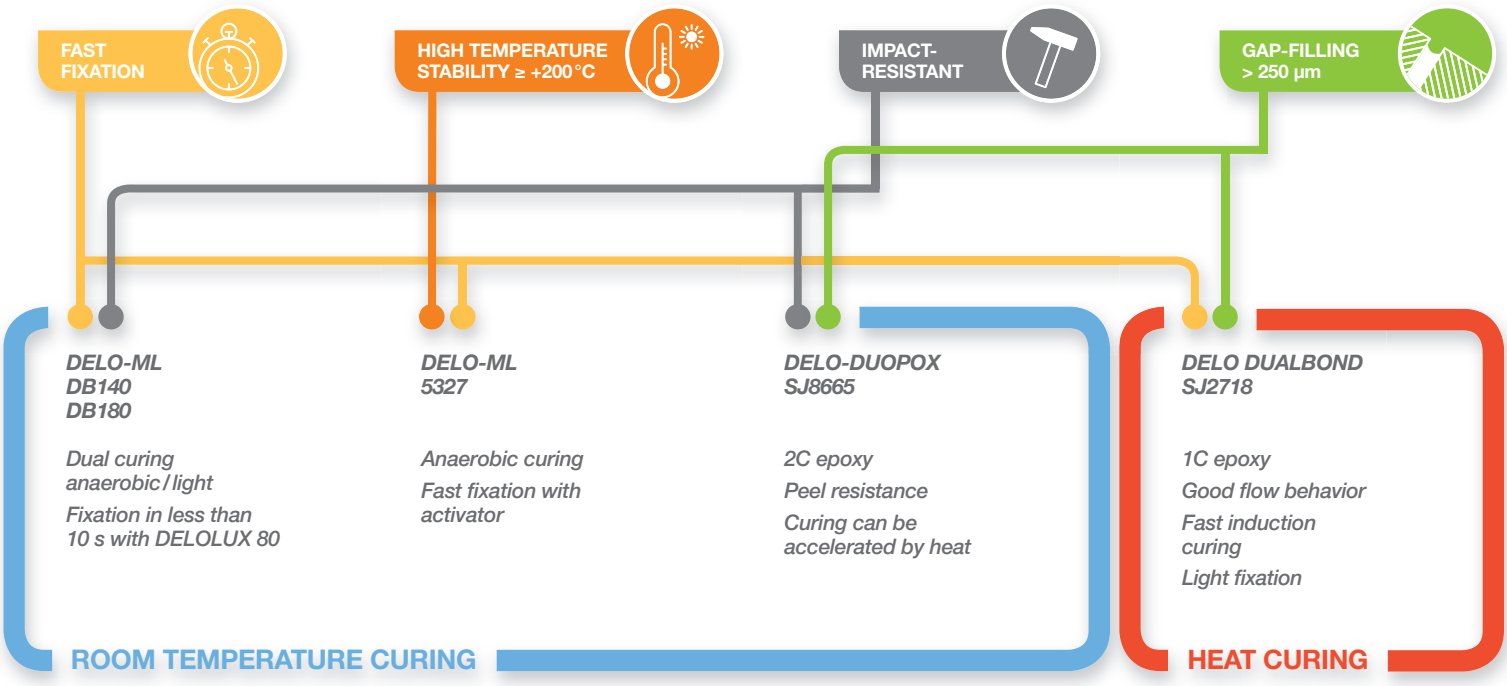
Bonding the stator laminations to the housing is more advantageous than conventionally joining these components by pressing or shrinking:

- Equalize tensions between the stator and housing with dissimilar CTEs
- Heat not mandatory
- More cost-efficient production
- Improved acoustics by damping properties of the adhesive
- Larger production tolerances possible

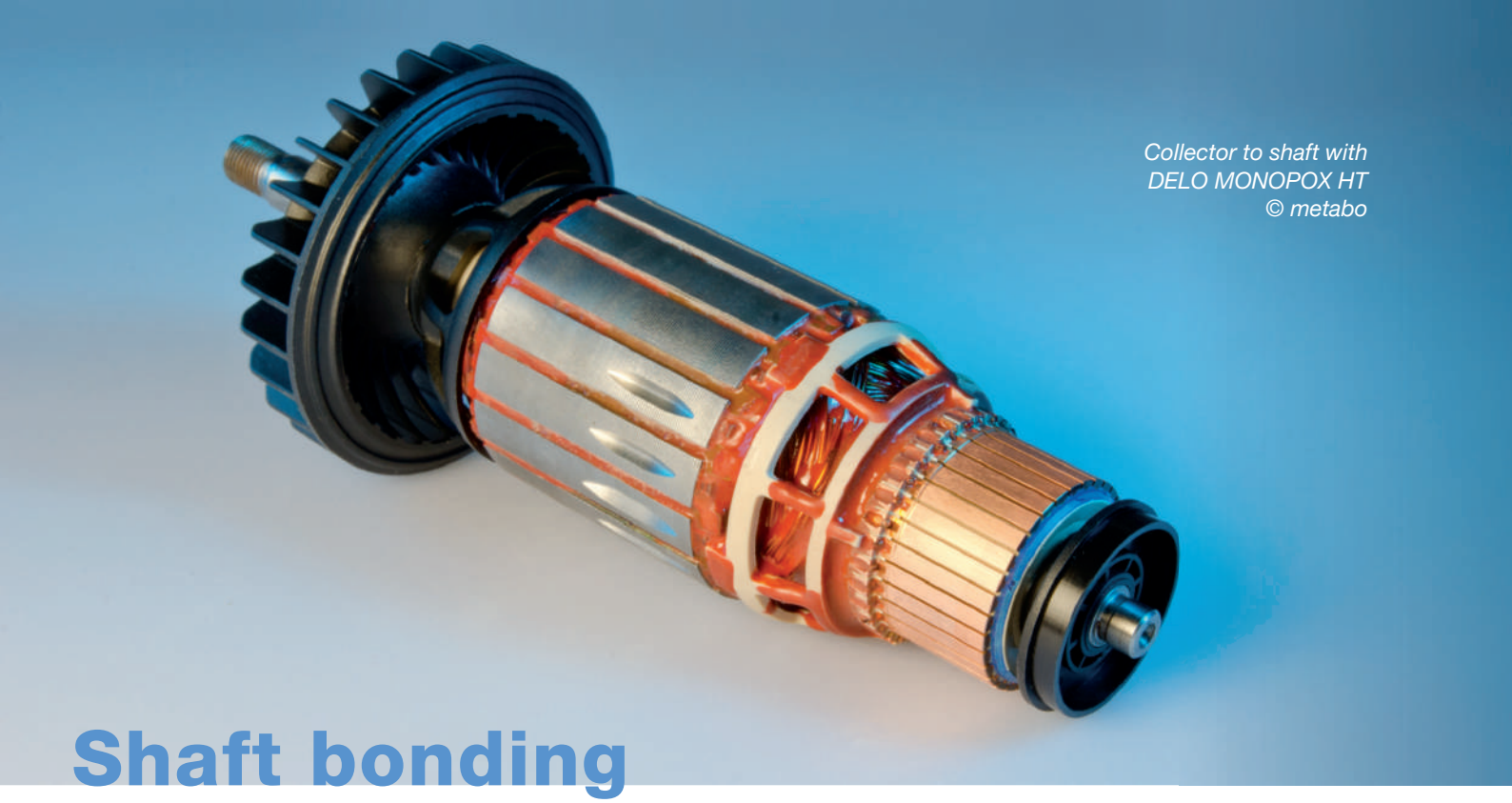
Your benefits

- High temperature stability up to +200 °C
- Fast light fixation for short cycle times (DELO-ML DB)
- Accelerated curing with activator (DELO-ML)
- Curing at room temperature (except for DELO MONOPOX)

Find the right adhesive …



DB = ***D****ual* ***B****onding* ***SJ*** = ***S****tructural* ***J****oining*



Collector to shaft with DELO MONOPOX HT
© metabo

Shaft bonding

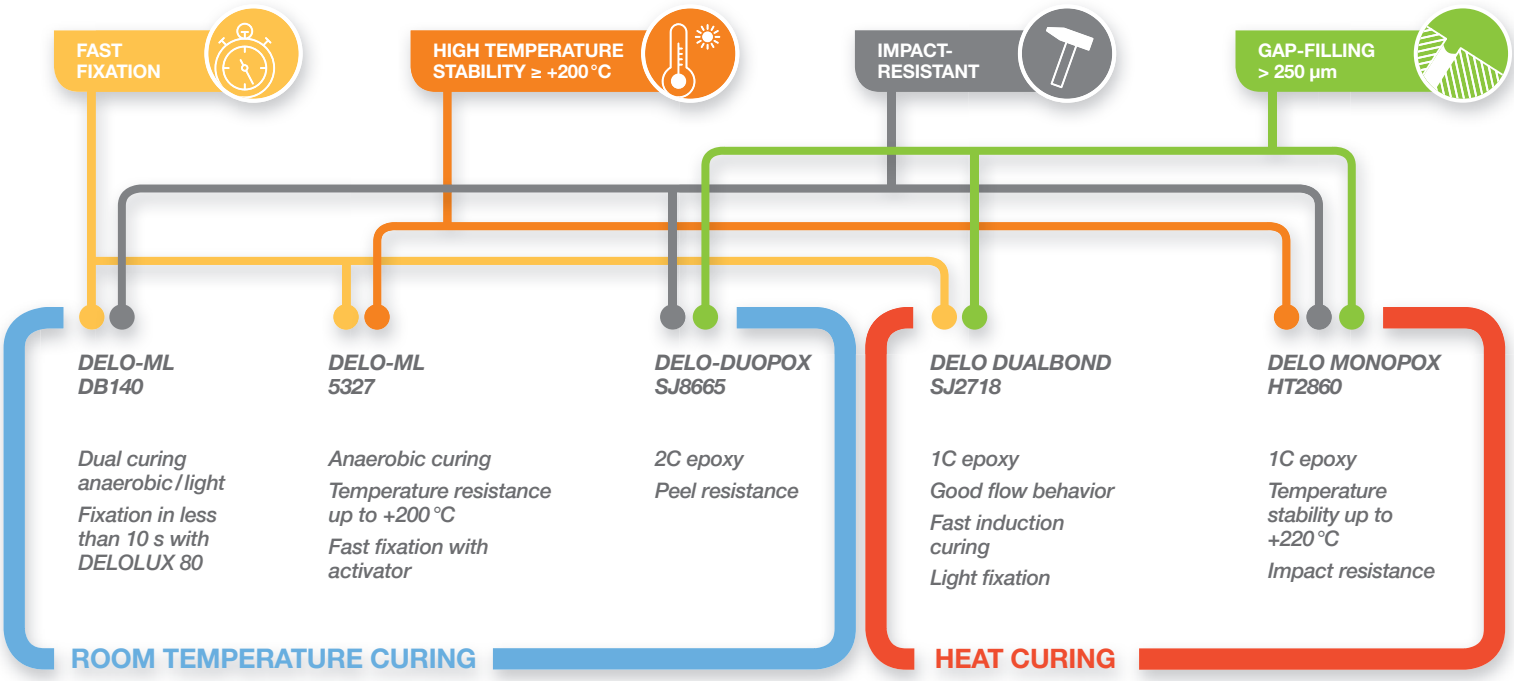
Similar to shaft-to-hub bonds in mechanical engineering, the shaft of e-motors is bonded to the bearing, rotor package and commutator. Anaerobic-curing, low-viscous adhesives are preferred as the bonding gap is narrower due to very low tolerances. Adhesive bonds have the following advantages over classical form- or force-closed joints:

- Low component production costs
- Easy to automate
- No clearance, no slip
- No friction or contact corrosion

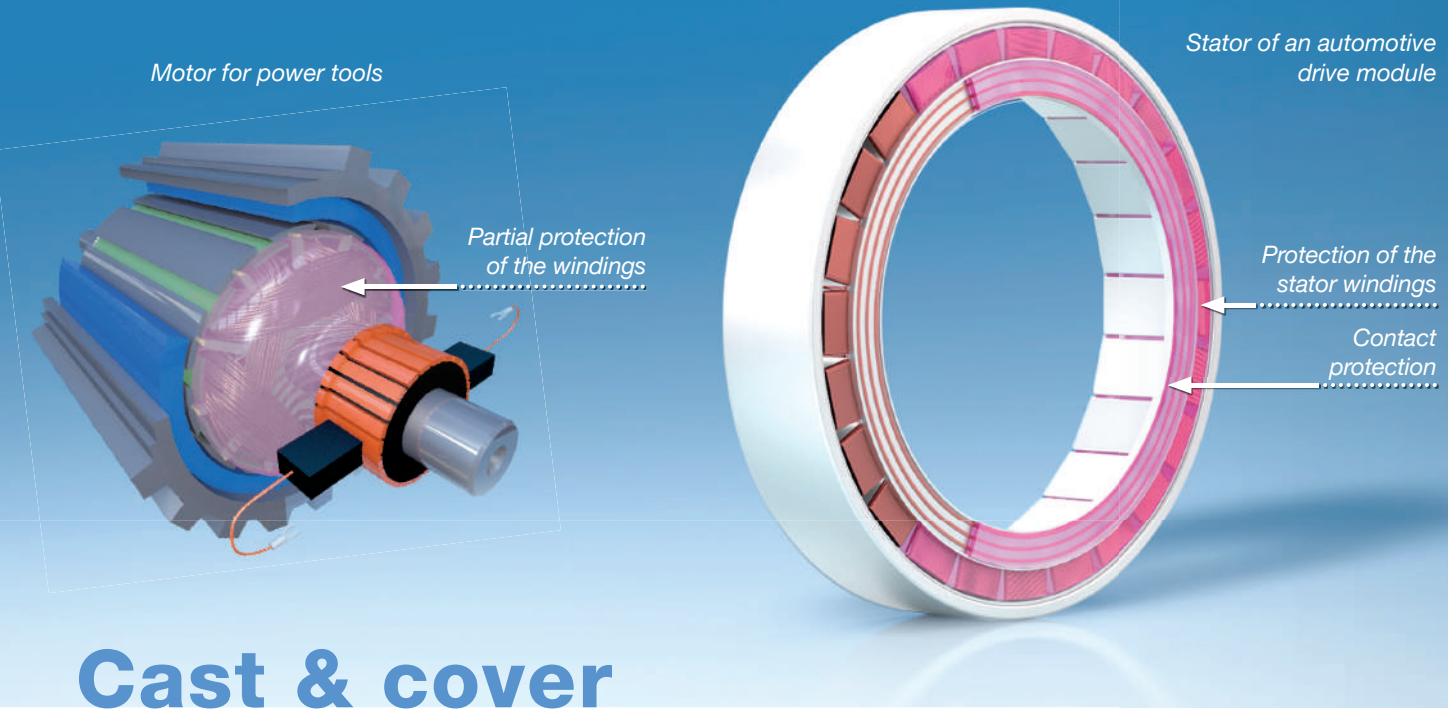
Your benefits

- Fast fixation by activator or light (DELO-ML)
- Curing at room temperature (DELO-ML, DELO-DUOPOX)
- Very high temperature stability up to +220 °C (DELO MONOPOX)

Find the right adhesive …



DB = Dual Bonding *HT = High Temperature* *SJ = Structural Joining*



Cast & cover

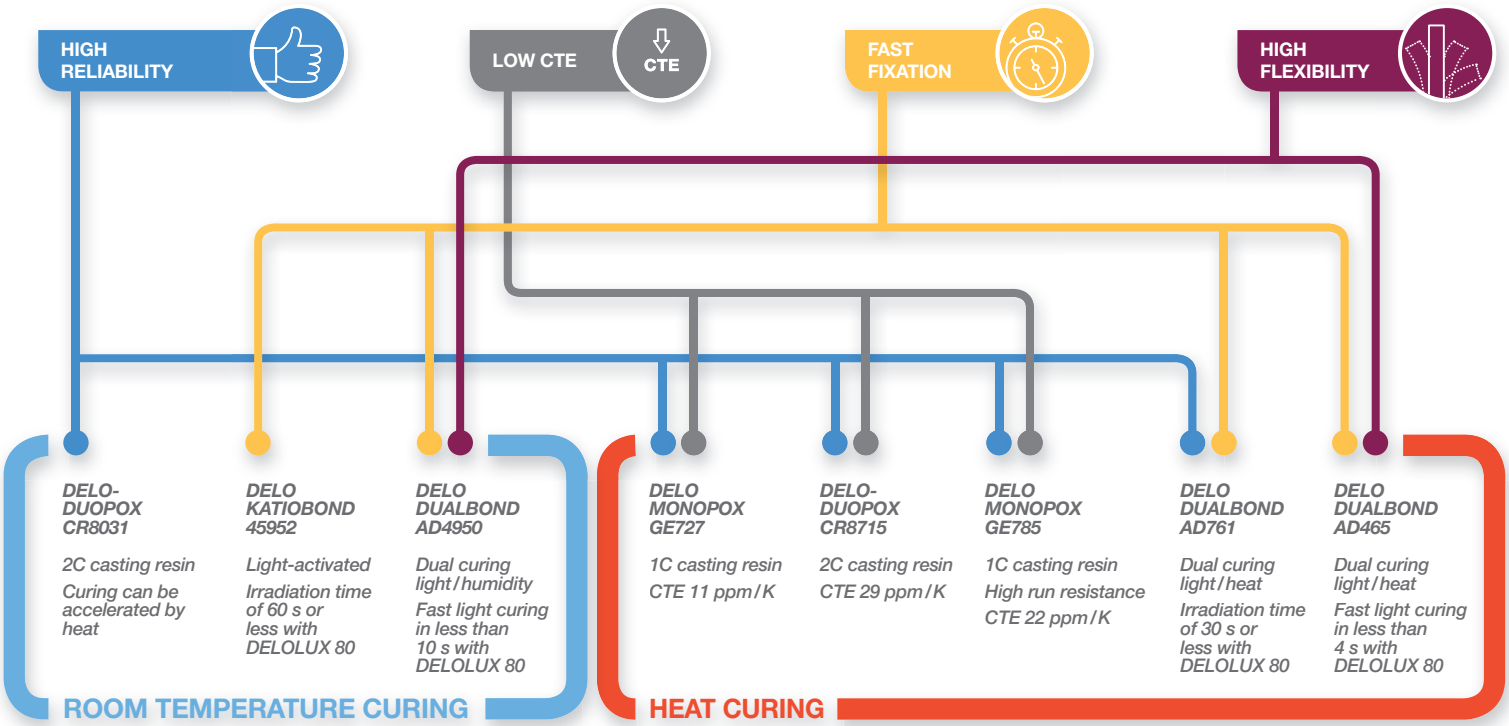
Casting compounds are used in e-motors to protect sensitive components from humidity, media or mechanical stress. Therefore, DELO's adhesives are used in the automotive industry due to these special challenges. Possible applications:

- Secure coil wires against vibration
- Cover soldered and welded contacts to protect them against corrosion
- Partial protection of windings from abrasive substances
- Stator casting

Your benefits

- Excellent resistance to aggressive substances (e. g. gear oil)
- Outstanding thermal resistance and low thermal expansion combine to minimize tensions between cast and component
- Very fast fixation or curing by light

Find the right adhesive …



AD = ADhesive *CR = Casting Resin* *GE = General Encapsulant*

Lab expertise

DELO is a technology leader, generating about 30 percent of its sales revenues with products developed in the last three years. In addition, 15 percent of revenues are invested in the research and development of adhesives and associated equipment.

These statistics are a result of the enormous laboratory expertise in the Windach headquarters: Comprehensive analytics and lab tests make it possible to find the right adhesive for every bonding task, including those in e-motor bonding.

In addition to chemical-physical characterization of adhesives, life cycle tests, application-specific test methods and process simulations are performed.

IDEA › DESIGN › PROTOTYPE › INTEGRATION › PRODUCTION › ONGOING SUPPORT

ADDITIONAL BONDING TASKS

Potting Compounds and Encapsulants

A COMPREHENSIVE OVERVIEW

of pretreatment methods can be found in the “BOND it – Reference Book on Bonding Technology”.

E-MOTOR PROCESS VIDEO

www.youtube.com/DELOadhesives

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